【CLAIMS】

【Claim 1】

A method for separating mixed signals into component signals comprising the steps of:

(a) producing current frames from said mixed signals (302);

(b) separating said current frames into component signals of the current frame (303);

(c) transforming said component signals using nonlinear functions into nonlinear-transformed signal (304);

(d) computing aliasing-free normalized cross-power spectra of said component signals and said nonlinear-transformed signals in (c) (305);

(e) computing natural gradient using said cross-power spectra (310);

(f) updating separating filter coefficients using said natural gradient (311);

(g) normalizing said separating filter coefficients (312);

(h) determining convergence conditions and iterating from (a) to (g) until convergence (313); and

(i) separating said mixed signals into component signals using said separating filter coefficients after convergence (314).

【Claim 2】

The method of claim 1 wherein step (b) further comprises the substeps of:

(b1) transforming said mixed frames and said separating filter coefficients into the frequency domain;

(b2) computing component signals in the frequency domain; and thereby transforming said component signals back into the time domain; and

(b3) zeroing the first L samples of said component signals; thereby producing component signals.

【Claim 3】

The method of claim 1 wherein step (d) further comprises the substeps of:

(d1) transforming said component signals and said nonlinear-transformed signals into the frequency domain;

(d2) computing cross-power spectra using said component signals and said nonlinear-transformed signals in the frequency domain (306);

(d3) computing power spectra of said component signals and the powere spectra of nonlinear-transformed signals (307);

(d4) computing normalized cross-power spectra (308); and

(d5) transforming said normalized cross-power spectra back into the time domain; and applying the time domain constraint for preserving only the first L samples (309).

【Claim 4】

The method of claim 1 wherein step (e) further comprises the substeps of:

(e1) applying the nonholonomic constraints to said aliasing-free normalized cross-power spectra; and

(e2) computing said natural gradient using said separating filter coefficients and said nonholonomic-constrained cross-power spectra.

【Claim 5】

An apparatus of claim 1 to claim 4 for separating a plurality of the mixed signals into a plurality of component signals using the frequency-domain normalized multichannel blind deconvolution method.

【Claim 6】

【Claim 7】

A computer readable storage medium of claim 1 to claim 4 containing a program that, when executed upon a general purpose computer system, causes said general purpose computer system to become a specific purpose computer system that separates a plurality of the mixed signals into a plurality of component signals using the frequency-domain normalized multichannel blind deconvolution method.